

FURTHER OBSERVATIONS ON THE LIFE HISTORY OF  
*ARGYREUS HYPERBIUS INCONSTANS* BUTLER  
(LEPIDOPTERA: NYMPHALIDAE) IN CAPTIVITY

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**Abstract**

Observations on the life history of *Argyreus hyperbius inconstans* Butler are recorded from material collected at Condong, northern New South Wales, and bred in captivity near Brisbane. The larval food plant is *Viola betonicifolia*, although other species of *Viola* may be acceptable. In captivity the ratio of males to females differs markedly from that previously published for wild populations.

**Introduction**

The Australian Fritillary, *Argyreus hyperbius inconstans* Butler, is distributed along the east coast of Australia from Gympie to Urunga (Common and Waterhouse 1981).

We collected a female specimen on 1 December 1981, a hot overcast day following recent rains, near Condong, New South Wales. She was netted while flying slowly across an area of *Viola betonicifolia* near cane fields and transferred to Birkdale near Brisbane in order to rear her progeny in captivity. Our subsequent observations are reported in this article and complement the life history notes published by Lambkin and Lambkin (1977) who bred the species from specimens collected near Gympie, south-eastern Queensland.

**Observations**

*Egg laying*

After capture, the butterfly was transferred to a plastic bag containing a small clump of food plant. Almost immediately, she began ovipositing on the leaves and stems. Egg laying continued for five days during which time she was fed twice daily on a honey-water solution supplemented with a minute amount of Sanatogen® protein food additive.

*Biology of larvae*

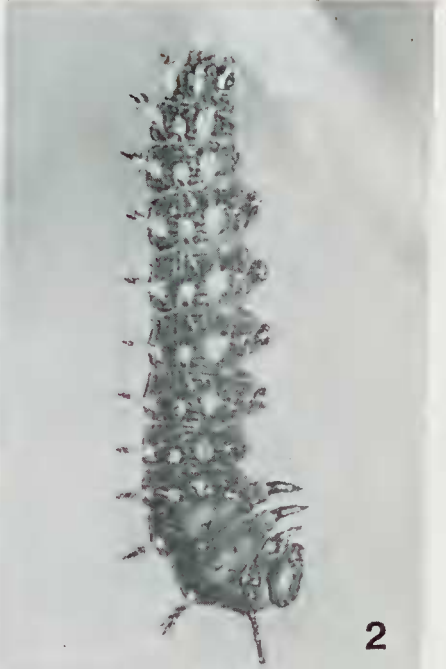
On 6 December the first larvae hatched and were placed directly onto food plant and surrounded with a fine nylon net sleeve. These were placed outdoors, in good light, with a northerly aspect, but not in direct sun. We were fortunate to have access to a friend's garden, containing *V. betonicifolia*.

On 10 December some larvae were in the second instar and by 25 December most of the larvae were in the final instar. Fig. 1 shows the anterior end of a fourth instar larva. It was observed that all larvae in captivity left the food plant at sunset, and at night apparently rested at the top of the sleeve. On one occasion two larvae remained on the food plant, these being in ecdysis. At sunrise the larvae returned to the food plant and fed throughout the daylight hours.

Four final instar larvae were placed on plants of *V. hederacea* and the common garden violet, *V. odorata* L. Small amounts of both plants were eaten before the larvae pupated. This fact, together with the observation that



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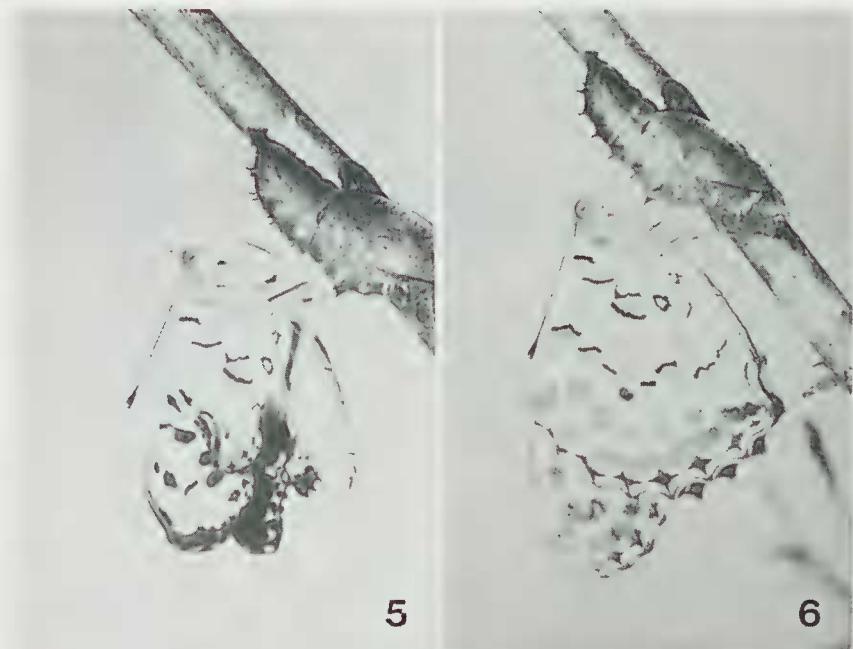


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Figs 1-4. *Argyreus hyperbius inconstans*: (1) anterior end of fourth instar larva, lateral view; (2) prepupa; (3) pupa, lateral view; (4) emerging imago.



Figs 5-6. *Argyreus hyperbius inconstans*: (5) teneral adult; (6) adult with wings fully expanded.

*V. hederacea* was eaten in earlier instars when presented accidentally, leads us to believe that it may be possible to use at least *V. hederacea* and possibly *V. odorata*, as substitute or supplementary food plants.

#### *Pupation*

On 26 December a final instar larva was noticed to become darker in colour, the dorsal longitudinal orange stripe fading and the pinkish-red spines darkening. It also appeared to have contracted slightly from its unstretched length of 45 mm. The larva was moving about in an agitated manner which was interpreted as a search for a suitable place to pupate. A pot of *Viola* was placed along with the larva in a small net emergence cage (300 x 300 x 500 mm high). The larva immediately ascended to the top of a twig placed upright in the pot, turned around and climbed down again. The twig was then angled at 45° whereupon the larva climbed to the top once more, spun a silken pad on the underside, and within thirty minutes was hanging suspended (Fig. 2).

On 29 December a complete pupation was witnessed. At 2.25 pm (Eastern Standard Time) four pairs of silver spines were showing through the corresponding larval spines of a prepupa. At 2.51 pm the prepupa had darkened, but there was no movement. At 3.18 pm violent contractions commenced, the twisting and lurching movements becoming continuous by 3.22 pm. At 3.23 pm the larval cuticle split over the thorax and the pupa worked the cuticle upwards until it was bunched up against the silken pad.

The cremaster was then withdrawn from the cuticle and with several violent twists, was securely hooked into the silken pad, while the larval cuticle was shed. At 3.27 pm pupation was complete except for further hardening (Fig. 3).

By 29 December most of the larvae had pupated after having consumed large clumps of food plant to within 3 cm of ground level. Those which pupated on food plants in the net chose sites furthest from the light source, some even pupating under the edge of the dark green tray on which the pots stood in the darkest situation available to them.

#### *Emergence of the adult*

On 3 January, 1982 the first pupae showed signs of emergence. At 8.20 am the colour of the wings showed clearly through the pupal skin, and three males emerged by 10.45 am. Next day three males emerged, on 5 January a further six males, and on 6 January the first females began to emerge (Figs 4-6). Adults continued to emerge until 15 January with the ratio of males to females being very close to 1: 1; This differs from previous observations in the field, where the male to female ratio was 10: 1 (Lambkin & Lambkin 1977). All butterflies emerged from the pupae during the morning.

#### *Pairing attempts*

One pair of reared adults was placed in a pairing cage (400 x 400 x 500 mm) in afternoon sunshine. In the cage was a honey pad, nectar flowers of *Pentas* and *Lantana*, and a plant of *V. betonicifolia*. The male was three days old, the female newly emerged. The male immediately attempted copulation, but the female was totally unreceptive. Another female was introduced to the cage, but again no copulation occurred.

During the next few days several eggs were laid but these were infertile, suggesting no mating had taken place. Several pairs were then introduced into an insectary, 4.8 x 4.8 x 2.4 m. Both males and females flew in the cage, and fed at the flowers of *Lantana*, *Pentas* and *Pseuderanthemum*. One male attempted copulation, but without success.

#### *Conclusion*

On 8 January, 1982, two reared pairs were reintroduced to the locality at Condong from which the original female had been taken. The area had recently been sprayed with herbicide. Drains around the cane fields had been cleared and the *Viola* plants destroyed. It is to be hoped that, having been rediscovered at this locality, the fritillaries will continue to maintain their colony.

#### **Acknowledgements**

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#### **References**

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